



MODULAR SECURITY ENCLOSURE FOR GAMING MACHINE

Field of the Invention

[001] This invention relates to gaming machines, and more particularly to enclosures for gaming machines.

Background of the Invention

[002] Gaming machines require secure enclosures to protect money stored inside, and to prevent tampering to generate improper pay-outs. A typical gaming machine is a "slot machine" with a housing having apertures for video monitor or reel viewing, money or card insertion, coin or token pay-out, and printed certificate or receipt production.

[003] To provide robust security, gaming machines typically employ housings that have few components, or unitary components, so that possible avenues of unauthorized entry such as seams, gaps, and the like are minimized or mitigated. A typical slot machine has a box-like housing that is open in the front, and which contains all the operational components of the machine. The front opening is secured by a "door" that is hinged to the housing, and which has a locking system to limit access to various levels of authorized personnel. Typical doors are in the shape of a rectangular frame, with welded horizontal cross members spanning between the sides of the frame, creating upper and lower rectangular apertures. Such doors are formed in several pieces, typically of sheet metal parts welded, ground, and polished to form a seamless surface without visible junctions or spaces through which cheating devices may be inserted. Such doors are finished after they are fully built, typically with bright polished chrome plating. Because the plating occurs after conventional doors are fully formed, the polishing of these large parts is very difficult and large plating tanks are required. This reduces the number of alternative plating service companies capable of providing the service, increasing plating costs and greatly reducing the availability of the service.

[004] In addition, some portions of the door may be concealed during normal service, such as the lower rail concealed behind a "belly door" that encloses the lower aperture. With unitary doors, even the concealed portions are plated in the manner of the exposed portions, increasing the portion plating costs associated with plating materials such as chromium.

Summary of the Invention

[005] The present invention overcomes the limitations of the prior art by providing a security enclosure for a gaming machine having a main housing defining a chamber and having a major opening. A door assembly is connected to the housing and moves between an open position providing external access to the chamber and a closed position securing the major opening. The door has a number of components, at least some of which are elongated elements having fasteners at opposed end portions. At least one of the elements may be unplated or have a different surface finish, because the members may be finished prior to assembly. Each element is narrow enough to be plated in a relatively shallow or narrow plating tank that would be inadequate to receive conventionally assembled door.

Brief Description of the Drawings

[006] Figure 1 is a perspective view of a gaming machine enclosure according to a preferred embodiment of the invention.

[007] Figure 2 is a exploded view of a gaming machine enclosure door according to the embodiment of Figure 1.

[008] Figures 3-6 are perspective views of modular door components according to the embodiment of Figure 1.

Detailed Description of a Preferred Embodiment

[009] Figure 1 shows a gaming machine security enclosure 10 for housing a slot machine. The enclosure has a main housing 12 in the form of a box defining a chamber with an open front enclosed by a door 14. The housing has a top panel 16, a right side panel 20, a left side panel 22,

back panel 24, and bottom panel 26. The housing is formed of sheet metal panels that are interconnected to each other, either by a permanent means such as welding or riveting, or by removable means such as screw fasteners.

[0010] The door 14 is a generally rectangular frame, and includes a left stile 30, right stile 32, top rail 34, bottom rail 36, and button rail 38. The stiles are substantially vertical members parallel to each other and positioned at the front edges of the side panels 20, 22 of the housing. The top rail 34 spans horizontally between the top ends of the stiles, the bottom rail 36 spans horizontally between the bottom ends of the stiles, and the button rail 38 spans horizontally between intermediate portions of the stiles spaced apart from both the top and bottom rails. The stiles and rails are assembled as will be discussed below to form a rigid door unit with no gaps at the junctions or seams between the door components, so that nothing may be inserted into the housing chamber enclosed by the door, to ensure security of the machine.

[0011] As shown in Figure 2, each of the stiles and rails is a formed sheet metal member having the shape of a channel closed at the sides and ends, and open at the rear. Each presents a convex shape to the front to provide a finished door appearance. Each part is folded to the illustrated shape from a stamped sheet, and joints where sheet edges meet are welded, ground, and polished to provide a seamless appearance secure against unauthorized entry.

[0012] As shown in figures 2 and 3, the left stile 30 has a set of upper fastener holes 40 defined on an inwardly-facing panel 42 near an upper end 44 of the stile. A set of lower fastener holes 46 penetrates the inner face near a lower end 50. A set of intermediate fastener holes 52 penetrates the inner face at an intermediate portion between the upper and lower ends. Threaded nuts (not shown) are attached at the holes 46 and 52 for receiving screws. The stile includes a stiffener plate 54 attached to an inner face of an outer side panel 56. The side panels define a channel having a tapered cross section that tapers to widen or flare toward the open rear of the stile. The right stile 32 is essentially the same as the left stile 30, in mirror image, except that left stile includes a facility for pivotally attaching to the housing via a hinge, and the right stile includes facility for a lock adapted to engage the housing for securing the door in a closed position.

[0013] As shown in Figures 2 and 4, the top rail 34 has a channel shape formed of sheet metal and finished as the stiles. The top rail has an upper panel 60, a lower panel 62, a left end panel 64 (shown on the right in the rear view of figure 4), a right end panel 66, and a front panel 70. The front panel defines a optional pair of apertures 72 for mounting audio speakers. The end panels 64, 66 each include several protruding threaded studs 74. The studs are preferably of the self-clinching style made by various manufacturers well known in the sheet metal industry. Alternately, clearance holes could be used and conventional screws could be inserted in place of the self-clinching studs. The studs are arranged in a pattern to be received in the respective upper holes 40 of the stiles, and protrude perpendicularly from the end panels 64, 66. The end panels are not necessarily parallel, but can be at acute angles from the front panel so that they occupy the same plane as the stile inner panels 42 when assembled. The top rail is secured to the stiles by engaging threaded nuts to the studs, accessing the studs through the open rear of the stiles.

[0014] As shown in Figures 2 and 5, the button rail 38 has a front panel 76, an angled top panel 80, a bottom panel 82, and side panels 84, 86. The panels are in the shape of a tray having an opening facing the rear. The top panel defines apertures 90 for gaming machine buttons to protrude, accessible to a user. The front panel includes apertures 92 for a currency validator and for receipt printers. The side panels each define holes that receive threaded screws 94 on each side that register with holes 52 on the stiles to attach in the manner noted above with respect to the top bar, for securing the button bar to the stiles without gaps at the junctions.

[0015] As shown in Figures 2 and 6, the bottom rail 36 is a forwardly-open channel having an essentially square cross section. It includes pivot bosses 96 adjacent to each end, forward of the channel portion. Screws 98 at each end are inserted from the interior and positioned to be received in lower holes 46 of the stiles, with threaded nuts attached to the stile at holes 46 for securing the bar in place as noted above.

[0016] Returning to Figure 1, the door 14 defines a rectangular upper aperture 100 above the button bar and a rectangular lower aperture 102 below the button bar. A video display bezel 104 is received in the upper aperture, and frames a video display terminal that is contained in the housing.

A belly door 106 occupies the lower aperture 102, and is pivotally connected to the pivot bosses 96 of the lower rail to pivot between an open position and the illustrated closed position, in which the entire lower aperture is securely enclosed by the belly door. In the closed position, the lower rail 36 is entirely concealed by the belly door.

[0017] The door is manufactured by forming each of the rails and stiles by stamping or other sheet metal cutting process, then folding each blanked sheet into the desired shape. All seams are welded, ground, and smoothed or polished, so that all visible front surfaces will have a uniform surface finish. Because the finishing steps are performed on the elongated smaller modular components, these steps are made easier, safer, and faster. This compares to the difficulty of finishing a large, cumbersome unitary door, with the challenges of polishing interior angles. The lower rail need not be finely finished after welding, because it will not be visible to the user. Then, the rails and stiles receive surface finishing. For the unexposed lower rail, it receives only a corrosion resistant paint, while the visible rails and stiles are plated with chrome or other desired metal or fine surface finish. The finish is generally applied directly to the formed and polished metal, with some finishes requiring several layers, such as lacquers or clear coats to protect pigmented paints or plating.

[0018] As shown in Figure 3, the longest components such as the stile 30 fits within an elongated plating tank 110 having a relatively shallow depth and relatively narrow width, each significantly less than the length of the shortest length rail. This allows plating with relative small quantities of fluid, small surface areas, and in a wider range of plating facilities than if the door were plated after conventional assembly. By plating separately before assembly, each rail may have any of a wide range of different surface finishes, coatings, and colors. This can provide design and aesthetic flexibility, as well as cost reduction by limiting the quantity of more expensive coating materials and processes employed. For instance, while the bottom rail may have a rough surface finish and be inexpensively painted, the stiles and top rails may receive a high-gloss paint or plating, while the button bar may receive a different finish such as gold plating that attracts the attention of

the user to the controls of the machine, and which would be cost-prohibitive if applied to the entire door. An additional benefit is realized when damage to one of the parts occurs during post finish handling only the damaged part needs to be replaced and not the entire door assembly.

[0019] After finishing, the rails and stiles are interconnected by the fasteners, with the fasteners being accessed from the rear of the door so that no fasteners are accessible from the outside of the enclosure after assembly. While removable and reusable fasteners such as the threaded studs, screws, and nuts are preferred because they permit rework and partial disassembly and reassembly for service and repair, alternative doors may use permanent fasteners such as rivets, screws and nuts, adhesives, and other methods that do not impair the pre-finished surfaces that will be visible to a user upon completion. After the door is assembled, the belly door is attached to conceal the bottom rail.

[0020] By forming and finishing the components before assembly, a modular system may be employed in which certain components may be used for different enclosures, such as standardized horizontal rails used for machines of different heights with different length stiles. Further, identical components may be stocked in different surface finishes, manufactured efficiently with large production volumes. By inventorying the components disassembled, significant space is saved. In addition, packages shipped to and from a plating company are significantly more compact, reducing shipping costs.

[0021] While the above is discussed in terms of preferred and alternative embodiments, the invention is not intended to be so limited. For instance, not all door components need to be fabricated of the same material. The modularity advantages of the invention may be achieved with elements of different materials, including plastic, composite, wood, glass, and unlimited other alternative in addition to or instead of sheet steel.